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# Investigating teachers' dyadic self-efficacy and its correlations to students' perceptions of teacher efficacy and student well-being

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## ABSTRACT

Most studies, to date, have ignored variance in teachers' self-efficacy (TSE) in relation to teaching individual students (i.e., student-specific self-efficacy). However, TSE and teacher efficacy differ among students. Thus, this study examines dyadic TSE in four domains and their correlations with students' perceptions of teacher efficacy and student academic self-concept and well-being. Results of a paper-pencil survey involving 29 teachers and 469 students (39.9% girls, aged 10–17 years) from German secondary schools reveal a moderate overlap between dyadic TSE and students' perceptions of teacher efficacy. Furthermore, they reveal variance in how teachers' and students' ratings are related.

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Self-efficacy; dyadic self-efficacy; student perceptions of teacher efficacy; academic self-concept; school well-being

## Introduction

Self-efficacy is the “belief in one’s capabilities to organise and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). In the teaching context, this concept can be defined as teachers’ “belief that one’s capabilities can bring about desirable changes in students’ behaviours and achievement” (Gibson & Dembo, 1984, as cited in Guo et al., 2010, p. 1095). Studies on teachers’ self-efficacy (TSE) have focussed on self-efficacy as a unidimensional or multidimensional construct that is applicable in all teaching contexts. However, in recent years, studies have shown that with regard to self-efficacy, context matters.

TSE in specific teaching domains (Fackler & Malmberg, 2016; Siwatu, 2011), such as TSE towards different subjects (e.g., maths: Lazarides et al., 2018; or English as a foreign language: Ghasemolani & Hashim, 2013) or for different school levels (e.g., primary or secondary education: Hoy & Woolfolk, 1993), has been addressed in the literature. Moreover, TSE has been operationalised in terms of context. For example, Tschannen-Moran and Hoy (2001) assessed TSE using three subscales: self-efficacy

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towards instructional strategies, classroom management, and student engagement. However, these studies assumed that TSE was the same across all students for one teacher and therefore ignored the individual teacher–student relationships in this context. This is an important gap in the literature: although teacher characteristics such as gender (Fackler & Malmberg, 2016) or years of teaching (Klassen & Chiu, 2010; Kraut et al., 2016) have been investigated, variations in individual students' personal characteristics and relationships with teachers have been largely ignored. Other fields of research also confirm that student variables such as behavioural problems (Baker et al., 2008) are clearly linked to the student–teacher relationship.

More recently, the assumption that TSE is consistent across all students has been challenged by Zee et al. (2016), who investigated the student-specific variance in TSE and considered the possibility that TSE might differ across individual students. They introduced the concept of dyadic TSE (i.e., one teacher–one student dyad).

### ***Student-specific teacher self-efficacy: a dyadic approach***

Zee et al. (2016) distinguished between inter-individual differences among teachers regarding TSE and intra-individual differences in their self-efficacy vis-à-vis individual students. The intra-individual variability in TSE is called “student-specific TSE” or “dyadic TSE,” and it measures teachers' beliefs in their capability to affect the learning of individual students. Student-specific differences in TSE are exemplified by an item on the teacher self-efficacy scale (TSES; Tschannen-Moran & Hoy, 2001, p. 800): “How much can you do to get children to follow classroom rules?” (Zee et al., 2016, p. 41). This item may be very confidently answered by teachers, as they rate their efficacy in classroom management from an overarching student perspective. Most students in class are well-behaved, and serious forms of misbehaviour in class (e.g., overt disruptive manners and rowdy behaviour) are rare (Beaman et al., 2007). Therefore, the general level of TSE towards the behaviour management of all students in class might be high. When teachers are asked to rate the same item in a student-specific way (e.g., “How much can you do to get student A or student B to follow classroom rules?”), their feelings of efficacy may vary depending on the student.

Zee et al. (2016) demonstrated the impact of student-specific TSE on TSE research. In particular, they not only investigated the differences in the TSE of both regular and special school teachers but also collected data on overall and student-specific TSE. Their results showed high variability in dyadic TSE in relation to students' behaviour management. This outcome is in line with findings suggesting that teachers tend to assess their ability to manage students' behaviour on the basis of their perceptions of the teacher–student relationship (Stuhlman & Pianta, 2002; Zee et al., 2016).

Schwab (2019) also examined the student-specific TSE of regular and special needs teachers, revealing a high variance in TSE related to individual students. The study results showed lower levels of self-efficacy in students with special educational needs (SEN) and an inter-rater correlation of  $r = .64$  between the student-specific TSE ratings of two teachers (a dyad of regular and special needs teachers who were teaching the same students). For boys and students with SEN, the inter-rater correlation was slightly lower. Another study (Schwab, 2019) investigated the overlap in the TSE ratings of

teachers of different subjects (English, German, and maths). The correlations ranged from  $r = .16$  to  $.52$  between two different teachers. The variance in the TSE ratings of one teacher towards his/her individual students was high, whereas the overlap between the ratings of two teachers towards the same student was rather moderate. These results demonstrate the importance of assessing TSE in a student-specific way.

In summary, only few studies have examined dyadic TSE, with some focussing only on the variance among teachers' ratings. To date, no study has investigated the outcomes of TSE on students.

### ***Effects of teachers' perceptions of self-efficacy***

Most of the studies on the impacts of TSE on students focus on students' academic outcomes (for an overview, see Zee & Koomen, 2016). One result frequently obtained in these studies is that a higher TSE has a positive effect on students' academic achievements. A possible explanation is that teachers with higher TSE may exert greater efforts in designing academically demanding lessons for students and providing them with differentiated feedback (Gibson & Dembo, 1984, p. 570). Some studies have also examined the effect of TSE on teacher engagement. For example, studies have shown that higher TSE is linked to greater efforts by teachers to improve their instructional practices and teaching methods (Miller et al., 2017; Ryan et al., 2015).

Studies have addressed the link between TSE and teacher well-being (Zee & Koomen, 2016). However, a gap remains related to studies on the relationship between TSE and students' emotional well-being at school. van Uden et al. (2013) noted that higher TSE is likely to lead to higher levels of student academic and emotional engagement.

To date, however, no study has assessed student-specific TSE in relation to students' views on teacher efficacy. Regarding student-specific TSE, Zee and Koomen (2020) showed that TSE ratings differ between classrooms and students, implying that the diverse aspects of TSE belief systems are activated against different contexts—for example, when considering beliefs on micro (student-specific) or macro (classroom) levels. Their results provide insights into the influence of student-specific TSE on several student variables. In particular, they reported that higher levels of student-specific TSE were positively correlated with students' behavioural and emotional engagement, which may in turn be traced back to students' distinct degree of well-being. Thus, investigating TSE as a fully dyadic concept opens possibilities for determining the importance of TSE for students.

In this vein, the current study investigates whether higher student-specific TSE is perceived by individual students. In the literature, students' perceptions have been used to examine teaching behaviour from different perspectives. For example, regarding teaching efficacy, studies have shown broad variations in the perceptions of teachers and students (Clausen, 2002; Kunter & Baumert, 2007; Urdan, 2004). Wagner et al. (2016) showed that during a three-month period, teacher and student ratings of the instructional efficacy of lessons had moderate to high internal consistency in terms of rating tendencies over time. The overlap of student and teacher ratings, however, strongly varied between individual measurement points over the three-month period.

These results confirm the minimal overlap of teacher and student ratings of teaching efficacy both for within a specific time period and across longitudinal measurements (Wagner et al., 2016). In the current study, investigating the overlap between teachers' and students' ratings is even more complex. Given that TSE is not an observable variable, student perceptions of teacher efficacy are related to their beliefs of whether a teacher is considered efficient in class (Skaalvik & Skaalvik, 2017).

### ***Goals of the present study***

TSE is a context-specific construct (Zee et al., 2016). However, little information is available on how individual students might impact a teacher's sense of efficacy or vice versa. The present study is based on the theoretical and methodological understanding of TSE as not only a student-overarching construct but also a student-specific phenomenon. Hence, the study aims to analyse how context (in this study, the particular students a teacher is working with) affects teaching and student outcomes (in this study, students' academic self-concept and school well-being).

### ***Research questions***

1. Does TSE vary between individual students?
2. Do teacher and students ratings vary across the efficacy domains?
3. To what extent do student and teacher ratings overlap?
4. Are there variations between teachers in terms of how their dyadic self-efficacy ratings are related to student ratings?
5. What is the relationship between dyadic TSE beliefs and students' academic self-concept and school well-being?
6. How do the four domains of dyadic TSE beliefs predict students' academic self-concept and well-being?

## **Method**

### ***Data collection and procedure***

The dataset used for the present study was part of the XY study conducted in autumn 2017 (October and November) in XY (a federal state in Germany). Classes from both urban and rural areas participated in the survey study. The survey participants included secondary school students (Grades 5–9) from all existing school types (schools that prepared students for different educational levels). Ethical approval was granted by University XY, and only students whose parents had signed a written consent form participated in the survey. All classes included at least one student with an official diagnosis of SEN. Thus, students with SEN are overrepresented in the sample (based on the total number of students from Grades 5–9). The proportion of students with a diagnosis of SEN in Germany was 7.1% in the school year 2016–2017 (Autorengruppe Bildungsberichterstattung, 2020). In Germany, many classes do not have any students with SEN, whereas in some cases, for example, one class has five students with SEN. Because only the classes with at least one student with SEN

participated in the survey, within this study, the proportion of students with SEN was higher; however, the difference was not significant (chi-square = 3.38;  $df = 1$ ,  $p > .05$ ).

### **Sample**

In total, 42 classes participated in the XY study. However, data from 13 classes could not be used, as the teachers did not fill out student-specific questionnaires for each of their students. Therefore, only data from 29 classes could be used here. From these 29 classes, 469 students participated (56.3% males, 39.9% females, and 3.8% missing or others). The average number of students in a class was 14.48 (std. = 7.52; range = 2–25). Students in Grades 5, 6, 7, 8, and 9 comprised 17.7%, 17.9%, 26.9%, 21%, and 16.4% of the sample, respectively. Of the student sample, 15.3% had a diagnosis of SEN, mostly involving learning disabilities. The majority (68.9%) of the students spoke German at home with their families, 19.7% spoke another language at home, and 11.4% spoke both German and another language at home. Around 89% of German households use the German language (De Statist, 2021). Therefore, students who speak another language than German at home were overrepresented in this sample (chi-square = 12.15;  $df = 1$ ,  $p < .001$ ).

The student-specific TSE ratings of the students from all 29 classes were obtained from their teachers. All teachers (21 females, 8 males; mean age = 41.31 years,  $SD = 11.77$ ) were teaching one main subject to the students in the sample (11 teachers were teaching German, 6 were teaching English, and 10 were teaching maths). Their years of teaching experience varied between 2 and 38 years ( $M = 13.98$ ,  $SD = 10.58$ ).

### **Measures**

#### **Teachers' student-specific self-efficacy**

Student-specific self-efficacy was assessed using a modified German version of the teachers' sense of efficacy scale developed by Zee et al. (2016). This scale is based on the TSES designed by Tschannen-Moran and Hoy (2001), which assesses three subscales (instructional strategies, classroom management, and student engagement). Based on the TSES, Zee et al. (2016) developed a new scale by adding a fourth domain (emotional support) that addressed student-specific self-efficacy.

As the teachers had to fill out the scale for each student in the class, the scale was made as short as possible. Accordingly, 16 (4 per scale) out of the 25 items in the scale of Zee et al. (2016) were translated into the German language using a translation and back-translation procedure to ensure translation quality. Then, the items were formulated as statements instead of questions (see Appendix). The items of all four domains—(1) instructional strategies (e.g., "I can adjust the lessons to the proper level for this student"), (2) behaviour management (e.g., "I can get this student to follow classroom rules"), (3) student engagement (e.g., "I can help this student to value learning"), and (4) emotional support (e.g., "I can provide a safe and secure environment for this student")—had to be answered using a five-point Likert scale ranging

from 1 (*Not at all true*) to 5 (*Completely true*). Schwab et al. (2021) showed that the reliability of the subscales was acceptable (Cronbach's alpha = .73–.85).

### ***Student rating of teacher efficacy***

To measure students' ratings of teacher efficacy, the student-specific self-efficacy items for teachers were slightly modified. For instance, the teachers were asked to answer one item ("I can craft stimulating questions for this student"), and the students rated whether they experienced that the teacher could really do so (e.g., "My teacher can craft stimulating questions for me;" see the [Appendix & Tables A & B](#)).

The same five-point Likert scale was used for the teacher and student samples. As this marked the first time the items were transferred into a student version, no information about the scale quality (reliability or factor structure) could be obtained from prior studies.

### ***Students' school well-being and academic self-concept***

Students' school well-being and academic self-concept were measured using the German student version of the perceptions of inclusion questionnaire (PIQ; Venetz et al., 2015). The four-item scales (school well-being: e.g., "I like it in school;" academic self-concept: e.g., "I am able to solve very difficult exercises") use a four-point Likert scale ranging from 1 (*Not at all true*) to 4 (*Certainly true*) as the answer format and show high psychometric quality (Venetz et al., 2019).

## **Preliminary results of the instrument**

### ***Confirmatory factor analyses***

First, the measurement models were tested separately for teachers and students. The analyses were performed with MLR estimation using the complex option, which adjusted the standard errors to be appropriate for the clustered data<sup>1</sup>. The models for both the teachers (chi-square = 205.28;  $df=96$ ;  $RMSEA = .05$ ;  $CFI = .93$ ;  $TLI = .92$ ;  $SRMR = .06$ ) and the students (chi-square = 203.08;  $df=98$ ;  $RMSEA = .05$ ;  $CFI = .94$ ;  $TLI = .92$ ;  $SRMR = .04$ ) fitted the data well (see Hu & Bentler, 1999). In the student model, two error variances were allowed to co-vary between the behaviour management (BMS) and student engagement (SES) factors. Moreover, the factor correlations were very high (see [Table 1](#)); thus, the results must be interpreted with caution.

Next, the teacher and student models were included in a simultaneous measurement model. The combined model fitted the data well (chi-square = 726.38;  $df=434$ ;  $RMSEA = .04$ ;  $CFI = .93$ ;  $TLI = .92$ ;  $SRMR = .05$ ). All factor loadings (see [Appendix](#)

**Table 1.** Inter-correlations between the teachers' ratings (below the diagonal) and students' ratings (above the diagonal).

	Instructional strategies	Behaviour management	Student engagement	Emotional support
Instructional Strategies	–	.97	.95	.95
Behaviour Management	.46	–	.93	.93
Student Engagement	.88	.57	–	.99
Emotional Support	.99	.52	.94	–

Note. For all correlations,  $p < .001$ .



**Table 2.** Descriptive results for the dyadic TSE ratings and students' ratings of teacher efficacy.

	Instructional strategies <i>M(SD)</i> 95% <i>CI</i>	Behaviour management <i>M(SD)</i> 95% <i>CI</i>	Student engagement <i>M(SD)</i> 95% <i>CI</i>	Emotional support <i>M(SD)</i> 95% <i>CI</i>
Teachers' ratings	3.88 (0.66) 3.82–3.94	4.30 (0.66) 4.24–4.36	3.91 (0.76) 3.84–3.98	3.89 (0.59) 3.84–3.95
Students' ratings	3.64 (0.83) 3.56–3.72	3.84 (0.82) 3.76–3.92	3.84 (0.86) 3.76–3.92	3.63 (0.87) 3.55–3.72

**Table 3.** Factor loadings of the four-dimensional factorial structure for teachers' and students' ratings of self-efficacy and teacher efficacy.

Items	Instructional strategies		Behaviour management		Student engagement		Emotional support	
	Teachers' ratings	Students' ratings	Teachers' ratings	Students' ratings	Teachers' ratings	Students' ratings	Teachers' ratings	Students' ratings
4	.81	.61						
7	.81	.67						
12	.65	.75						
13	.84	.66						
3			.86	.67				
8			.73	.57				
11			.68	.76				
14			.73	.55				
2					.78	.74		
6					.83	.70		
10					.79	.71		
15					.81	.62		
1							.54	.72
5							.48	.51
9							.76	.69
16							.77	.62
Reliability	.85	.77	.73	.73	.87	.77	.73	.72

Note. All factor loadings are significant ( $p < .001$ ).

Table A1) were significant in both the teachers' and students' ratings. With the exception of one factor loading (Item 5 in the teachers' rating), all loadings were above .5. The reliability scores (Cronbach's alpha) were acceptable, ranging between .72 and .87 (Table 2).

## Results

Means of the teachers' and students' ratings (see Table 3) were calculated as summary variables (SPSS), and some descriptive aspects can be pointed out. First, in general, the teachers rated their dyadic TSE rather high (all mean scores were above the theoretical scale mean of  $M = 3$ ). Similarly, the students' ratings of the corresponding scales were also high. However, the teachers gave higher ratings of efficacy than the students for all subscales except student engagement, as indicated by the non-overlapping confidence intervals. In addition, for the teachers, the highest mean score was on the behaviour management subscale, whereas the mean scores for the other three subscales were not significantly different. For the students, the ratings for instructional strategies and emotional support were

**Table 4.** Inter-correlations between the teachers' and students' ratings.

		Students' ratings			
		Instructional strategies	Behaviour management	Student engagement	Emotional support
Teachers' Ratings	Instructional Strategies	.31***	.35***	.34***	.27**
	Behaviour Management	.17*	.19 ns.	.18 ns.	.15 ns.
	Student Engagement	.28**	.31***	.36***	.28**
	Emotional Support	.33***	.40***	.39***	.38***

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; ns.: non-significant.

significantly ( $p < .05$ ) lower than those for behaviour management and student engagement.

### ***Inter-correlations between the four factors of teachers' and students' ratings***

Table 1 shows the inter-correlations of the four latent factors between the teachers' and students' ratings. Dyadic TSE ratings for emotional support strongly correlated with their self-efficacy for student engagement. In addition, student engagement and instructional strategies were highly correlated. Behaviour management, however, only moderately correlated with the other three subscales. For students' ratings, all the correlations were very high, indicating that the factors shared a large amount of common variance (ranging between 86% and 98%), although the four-factor model fitted the data well.

### ***Overlap between teachers' and students' ratings***

Table 4 shows the correlation of the latent factors between the teachers' and students' ratings. The results showed a significant overlap between the teachers' and students' ratings, as indicated by the significant moderate correlations (ranging between .31 and .38) for three of the factors. However, for behaviour management, no significant correlation was found between the teachers' and students' ratings. Furthermore, the teachers' ratings for emotional support were, in particular, highly correlated across all the students' ratings. Dyadic TSE for behaviour management had low positive correlation with students' ratings of instructional strategies. Although the convergent correlations seem, on average, slightly higher than divergent correlations, the relationship between the sub-dimensions is not clear. This is not surprising given the high inter-correlations between all dimensions of the students' ratings.

### ***Relationship between overall teachers' and students' ratings of efficacy and variance between teachers in this relationship***

As the inter-correlations were high, especially between the latent factors of the students' ratings, further analyses were performed to consider the clustering of the data with summary scores that represented the overall dyadic TSE and the corresponding students' ratings. The analyses showed that the intra-class correlations for students' and teachers' ratings were .13 and .43, respectively. A two-level analysis (Mplus) predicting students' ratings based on teachers' ratings on the within level and estimating

**Table 5.** Correlations between dyadic TSE and students' school well-being and academic self-concept.

Teachers' ratings	Students' ratings	
	School well-being	Academic self-concept
Instructional Strategies	.05	.24***
Behaviour Management	-.03	.04
Student Engagement	.08	.30***
Emotional Support	.03	.22***

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Table 6.** Dyadic TSE scales as predictors of students' academic self-concept.

	Std. Beta	Semi-partial correlation
Instructional Strategies	-.00	-.00
Behaviour Management	-.17**	-.14
Student Engagement	.37***	.20
Emotional Support	.02	.01
$R^2$	.11	

the random intercept and slope for the between level was performed to test whether the variance of the slope of this regression was significant at the between level. Both the mean (.287,  $p = .001$ ) and variance (.094,  $p = .014$ ) of the slope were significant at the between level. Comparison of the standard deviation of the slope (.306) with the mean slope (.287) shows a significant variance in how teachers' and students' ratings overlap. Moreover, for some teachers or classes, the relationship is close to zero, whereas for others, meaningful prediction of students' ratings can be obtained based on teachers' ratings.

### **Correlations between teachers' dyadic self-efficacy and students' school well-being and academic self-concept**

Finally, the correlations between the teachers' ratings of dyadic self-efficacy, student well-being, and students' academic self-concept were calculated (see Table 5). Dyadic TSE in behaviour management was not significantly related to student outcomes. However, all the other types of dyadic TSE had significant correlations with students' academic self-concept, with values ranging from .22 to .30. Note that because students' school well-being was not related to dyadic TSE, no further analyses were conducted.

Finally, linear regression analysis was conducted to test the multivariate relationships between all the dyadic TSE scales and students' academic self-concept (see Table 6). Results showed that students' academic self-concept was predicted by dyadic TSE in behavioural management (*Std. beta* =  $-.17$ ,  $p < .01$ ) and student engagement (*Std. beta* =  $.37$ ;  $p < .001$ ), with an overall prediction of  $R^2 = .11$ . The relationships of instructional strategies and emotional support with students' academic self-concept were not significant when the effects of the other two dyadic TSE variables were controlled for.

At the same time, the relationships of behaviour management and student engagement with academic self-concept increased. This indicates two findings. First, dyadic TSE in student engagement has the highest predictive power when the effects of

other variables are controlled for. Second, the semi-partial correlation of dyadic TSE in behaviour management in the regression analysis is higher than its bivariate correlation, suggesting that it functions as a suppressor variable in the equation. In other words, it can clear some of “the outcome-irrelevant variation from the independent variables, thus revealing the true relationship between the independent and outcome variables” (Pandey & Elliot, 2010, p. 36). Therefore, the interpretation of the negative sign of the prediction, while being theoretically counterintuitive, may be statistically understandable as a result of the low correlation of behaviour management with the outcome variable and function as a suppressor (Pandey & Elliot, 2010).

## Discussion

Our major findings were that the four-factor structure of dyadic TSE could be established both for teachers and students and that their ratings do have a modest overlap. However, the magnitude of the overlap between teachers’ and students’ ratings varied between teachers. Overall, only the dyadic TSE of student engagement predicted academic self-concept of students.

In more detail, focussing first on the descriptive results, teachers experiencing their highest self-efficacy on the behaviour management subscale has also been reported by Zee et al. (2016) and Schwab et al. (2021). This means that at the individual or dyadic level, teachers experience high efficacy in managing students’ behaviours; however, this may not be the case at the group level, as studies show how challenging behaviours serve as a major stressor for teachers (De Boer et al., 2011).

The descriptive results further indicate that teachers’ perceptions of self-efficacy are relatively high, even higher than the students’ ratings of teachers’ efficacy, which represents the same dimension. To the best of our knowledge, this study is the first to address dyadic TSE and students’ perceptions of the same concept (defined here as “teacher efficacy”); thus, making comparisons with the extant literature is difficult. However, some studies on teaching efficacy have similarly shown that teachers rate their teaching quality higher than students do (Wagner et al., 2016). One possible explanation for this is that teachers have a tendency to report higher values because of their norm-confirmative behaviours, such as social desirability (Faddar et al., 2018).

The confirmatory factor analysis of the scale structure reached an acceptable model fit, but the correlations between the (latent) factors of the teachers’ and students’ ratings were rather moderate, which is a promising finding. The fact that inter-rater correlation was not significant for behaviour management might be linked with the high ratings the teachers gave their self-efficacy beliefs regarding managing students’ behaviours, which may suggest that the social desirability bias is the highest in teachers’ assessment of their confidence in the behaviour management subscale. Because research into teachers’ attitudes suggests that handling students with behavioural problems is especially experienced as challenging by teachers (e.g., De Boer et al., 2011), the nature of dyadic versus general efficacy in behaviour management warrants further analyses in future research.

Comparison of the correlations among the teachers or among the students themselves as well as between the two groups (teachers and students) clearly indicates that the variance within the rater is much higher than the variance within the construct. High method variance and low construct variance have also been reported by other studies on students' and teachers' ratings (for ratings of students' perceptions of inclusion, see Venetz et al., 2019) and ratings of students' characteristics (see Sointu et al., 2012). Furthermore, previous studies, such as those in the field of teaching quality, have indicated that teachers' and students' perspectives do not correspond to each other very well (Clausen, 2002; Kunter & Baumert, 2007). This may be attributable to the teachers' ratings being biased owing to other student characteristics, such as conformity, achievement level, or student background. Another explanation might be that the gap reflects the difference between teachers' actual efficacy and efficacy beliefs, given that such beliefs do not appropriately reflect their actual efficacy. This result suggests that research should use different raters and perspectives to control for method specificity. One implication of our results for practice or policy is that to gain a more holistic picture of education as well as teaching and learning processes in schools, both teachers' and students' perspectives should be considered as a relevant source of data for school and teacher education development.

As the confirmation of the factor structure, especially for the students, remained somewhat inconclusive, further analyses were performed with the overall summary score that considered data clustering. The significant random slope suggests variance in the overlap between teachers' and students' ratings at the classroom level: for some teachers, the overlap is relatively high, whereas for other, it is close to zero. This result indicates that the precision by which teachers' beliefs in their efficacy as teachers match with the students' evaluation of their efficacy significantly varies across classrooms. It is beyond the scope of this study to test the implications of this variance, but one could assume that there is better reciprocity between teachers and students, especially in classrooms where the match is good. Perhaps students see high efficacy as representing high teaching quality, or perhaps students give feedback on the high quality, which then affects their teachers' efficacy. These questions deserve concrete empirical testing in future studies using multi-level data from classrooms with a larger sample size.

The last research question focussed on the link between TSE beliefs and students' academic self-concept and school well-being. The TSE domains showed no relationships with students' well-being. However, significant associations were observed for academic self-concept. The more teachers believed that they could address students' individual engagement, the higher the academic self-concept of the students. This result is similar to the findings of Scherer et al. (2016), who showed that students' perceptions of teachers' instructional efficacy correlated with their own academic self-concepts. However, as the perspectives of different raters (teachers and students) were used in the current study, the evidence it provides is stronger: students can sense, to an extent, teacher efficacy, and TSE seems to have an effect on students' perceptions of themselves as learners (self-concept). A possible explanation for this finding is that teachers who are perceived as very strict are taking away any autonomy and personal responsibility from students by trying to take total control over processes within the

classroom. This might lead to students perceiving their efficacy as low and feeling lower confidence in their abilities. The finding that efficacy in behaviour management negatively predicts students' academic self-concept must be interpreted in light of its role as a suppressor variable, especially in how it suppresses some of the irrelevant variance of other predictors. Having near to zero bivariate correlation to the outcome yielded a negative coefficient of behaviour management in the multivariate prediction, as it enhanced how dyadic efficacy in engagement predicted the students' self-concept.

The finding that no relationship exists between students' well-being and dyadic TSE seems to suggest that teachers' beliefs in their efficacy are related only to the students' view of themselves as students (i.e., their academic self-concept) and not to their personal well-being. An assumption can be made that teacher efficacy, particularly in emotional support, would have been linked to well-being. However, this remains a topic that should be more closely studied in future research. For example, the variance in students' well-being could be explained by many out-of-class or even out-of-school situations in the students' lives, which might be unknown to their teachers. Thus, controlling some of these factors could provide more exact estimates regarding the relationship between teachers' efficacy and students' well-being.

In summary, the overall results highlight the importance of dyadic TSE. In particular, the results suggest that dyadic efficacy—for example, considering individual students as the context against which teachers evaluate their efficacy—is a meaningful theoretical concept that should be included in future research on teacher efficacy.

### **Limitations**

One limitation of this study is that the results on the relationships between individual factors must be interpreted with caution. This is because the factors are highly correlated and the results from the differentiation between the latent constructs of students' ratings remain inconclusive.

Another possible limitation is that whereas teachers rated their efficacy towards individual students in domains such as engagement, behaviour management, and emotional support, we did not have any evidence for student variance in these domains. In future studies, it would be interesting to measure student behaviour, engagement, and emotional states and then use these as covariates in models correlating teachers' and students' ratings or outcomes. The results from these analyses would be able to more closely demonstrate the unique predictive value of dyadic TSE on student outcomes.

A further limitation of the present study is the small number of classes. Although the data are nested (students within classes), a larger number of classes allow for more in-depth analyses with latent variables that would account for possible intra-class correlations and class-level effects. However, the data clustering was included in an analysis with an overall summary score of the ratings; results showed that the extent to which the teacher ratings predicted student ratings varied between classes (significant random slope). This finding warrants further studies and replication with

latent variables and inquiries into what specific teacher characteristics predict the slope variance.

## Conclusion

The present study made a novel attempt to further investigate the meaning of dyadic TSE by connecting it to students' ratings and outcomes. The results provided evidence that teachers' student-specific self-efficacy ratings were linked to students' individual ratings. Therefore, in line with previous studies (Schwab et al., 2021; Zee et al., 2016), assessing TSE beliefs individually (i.e., for each student) is meaningful. Future studies and interventions should accordingly consider student-specific variance in teacher efficacy. Perhaps dyadic efficacy as a concept could deepen our understanding of why learning support interventions, even those with group-level evidence on high efficacy, show good results for most students but remain unresponsive for other.

From a practical perspective, one positive outcome is that teachers can realise that they have a high level of self-efficacy towards certain students. Knowing that they have somewhat lower self-efficacy towards other students might help them understand why they struggle to teach some students. For instance, dyadic efficacy beliefs might suggest that teachers could improve their confidence in their teaching by acquiring new competencies in any of the domains measured here. On the one hand, dyadic efficacy in engagement seems to be most strongly related to student outcomes; hence, skills in the other three domains should also be developed. Importantly, teacher efficacy should be related to students' well-being. On the other hand, because challenging behaviours are a major stressor for teachers (Friedman-Krauss et al., 2014; Jeon et al., 2018; Ouellette et al., 2018; Sun et al., 2018), improving teachers' skills and helping them gain new mastery and experiences, even with difficult students, could increase teachers' well-being.

In conclusion, this study supports the fundamental notion that feelings of efficacy depend on the context. Hence, in the field of teaching and learning, the interaction between the teacher and each individual student is another context that needs to be considered in efficacy research.

## Note

1. Analyses were performed with Mplus 8.1. We received a warning regarding the quality of standard errors based on the fact that the number of clusters compared with parameters was small. However, we prefer these results over running models that would not consider the clustering of the data.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## References

- Autorengruppe Bildungsberichterstattung. (2020). *Bildung in Deutschland 2020. Ein indikatoren-gestützter Bericht mit einer Analyse zu Bildung in einer digitalisierten Welt* [Education in Germany 2020: An indicator-based report with an analysis of education in a digitalized world] wbv Publikation.
- Baker, J. A., Grant, S., & Morlock, L. (2008). The teacher-student relationship as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly*, 23(1), 3–15. <https://doi.org/10.1037/1045-3830.23.1.3>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.
- Beaman, R., Wheldall, K., & Kemp, C. (2007). Recent research on troublesome classroom behaviour. *Australasian Journal of Special Education*, 31(1), 45–60. <https://doi.org/10.1017/S1030011200025586>
- Clausen, M. (2002). *Unterrichtsqualität: eine Frage der Perspektive?: Empirische Analysen zur Übereinstimmung, Konstrukt- und Kriteriumsvalidität* [Quality of instruction: A matter of perspective?] Waxmann.
- De Boer, A., Pijl, S. J., & Minnaert, A. (2011). Regular primary schoolteachers' attitudes towards inclusive education: A review of the literature. *International Journal of Inclusive Education*, 15(3), 331–353. <https://doi.org/10.1080/13603110903030089>
- De Statis. (2021, May 12). *Pressemitteilung Nr. 329 vom 5. September 2018* [Press Release No. 329 of September 5, 2018]. [https://www.destatis.de/DE/Presse/Pressemitteilungen/2018/09/PD18\\_329\\_122.html](https://www.destatis.de/DE/Presse/Pressemitteilungen/2018/09/PD18_329_122.html)
- Fackler, S., & Malmberg, L. E. (2016). Teachers' self-efficacy in 14 OECD countries: Teacher, student group, school and leadership effects. *Teaching and Teacher Education*, 56, 185–195. <https://doi.org/10.1016/j.tate.2016.03.002>
- Faddar, J., Vanhoof, J., & De Maeyer, S. (2018). School self-evaluation or self-deception? The impact of motivation and socially desirable responding on self-evaluation results. *School Effectiveness and School Improvement*, 29(4), 660–678. <https://doi.org/10.1080/09243453.2018.1504802>
- Friedman-Krauss, A. H., Raver, C. C., Neuspiel, J. M., & Kinsel, J. (2014). Child behavior problems, teacher executive functions, and teacher stress in Head Start classrooms. *Early Education and Development*, 25(5), 681–702.
- Ghasemboland, F., & Hashim, F. B. (2013). Teachers' self-efficacy beliefs and their English language proficiency: A study of nonnative EFL teachers in selected language centers. *Procedia - Social and Behavioral Sciences*, 103, 890–899. <https://doi.org/10.1016/j.sbspro.2013.10.411>
- Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76(4), 569–582. <http://dx.doi.org/10.1037/0022-0663.76.4.569>
- Guo, Y., Piasta, S. B., Justice, L. M., & Kaderavek, J. N. (2010). Relations among preschool teachers' self-efficacy, classroom quality, and children's language and literacy gains. *Teaching and Teacher Education*, 26(4), 1094–1103. <https://doi.org/10.1016/j.tate.2009.11.005>
- Hoy, W. K., & Woolfolk, A. E. (1993). Teachers' sense of efficacy and the organizational health of schools. *The Elementary School Journal*, 93(4), 355–372. <https://doi.org/10.1086/461729>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. [Database] <https://doi.org/10.1080/10705519909540118>
- Jeon, L., Buettner, C. K., & Grant, A. A. (2018). Early childhood teachers' psychological well-being: Exploring potential predictors of depression, stress, and emotional exhaustion. *Early Education and Development*, 29(1), 53–69. <https://doi.org/10.1080/10409289.2017.1341806>
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology*, 102(3), 741–756. <https://doi.org/10.1037/a0019237>
- Kraut, R., Chandler, T., & Hertenstein, K. (2016). The interplay of teacher training, access to resources, years of experience and professional development in tertiary ESL reading teachers'



- perceived self-Efficacy. *Gist: Education and Learning Research Journal*, 12, 132–151. <https://doi.org/10.25817/16925777.248>
- Kunter, M., & Baumert, J. (2007). Who is the expert? Construct and criteria validity of student and teacher ratings of instruction. *Learning Environments Research*, 9(3), 231–251. <https://doi.org/10.1007/s10984-006-9015-7>
- Lazarides, R., Buchholz, J., & Rubach, C. (2018). Teacher enthusiasm and self-efficacy, student-perceived mastery goal orientation, and student motivation in mathematics classrooms. *Teaching and Teacher Education*, 69, 1–10. <https://doi.org/10.1016/j.tate.2017.08.017>
- Miller, A. D., Ramirez, E. M., & Murdock, T. B. (2017). The influence of teachers' self-efficacy on perceptions: Perceived teacher competence and respect and student effort and achievement. *Teaching and Teacher Education*, 64, 260–269. <https://doi.org/10.1016/j.tate.2017.02.008>
- Ouellette, R. R., Frazier, S. L., Shernoff, E. S., Cappella, E., Mehta, T. G., Mariñez-Lora, A., Cua, G., & Atkins, M. S. (2018). Teacher job stress and satisfaction in urban schools: Disentangling individual-, classroom-, and organizational-level influences. *Behavior Therapy*, 49(4), 494–508.
- Pandey, S., & Elliott, W. (2010). Suppressor variables in social-work research: Ways to identify in multiple regression models. *Journal of the Society for Social Work and Research*, 1(1), 28–40. <https://doi.org/10.5243/jsswr.2010.2>
- Ryan, A. M., Kuusinen, C. M., & Bedoya-Skoog, A. (2015). Managing peer relations: A dimension of teacher self-efficacy that varies between elementary and middle school teachers and is associated with observed classroom quality. *Contemporary Educational Psychology*, 41, 147–156. <https://doi.org/10.1016/j.cedpsych.2015.01.002>
- Sointu, E. T., Savolainen, H., Lappalainen, K., & Epstein, M. H. (2012). Parent, teacher and student cross informant agreement of behavioral and emotional strengths: Students with and without special education support. *Journal of Child and Family Studies*, 21(4), 682–690.
- Scherer, R., Nilsen, T., & Jansen, M. (2016). Evaluating students' perceptions of instructional quality across three countries: An investigation of their factor structure, measurement invariance, and relations to educational outcomes. *Frontiers in Psychology*, 7, 110. <https://doi.org/10.3389/fpsyg.2016.00110>
- Schwab, S. (2019). Teachers' student-specific self-efficacy in relation to teacher and student variables. *Educational Psychology*, 39(1), 4–18. <https://doi.org/10.1080/01443410.2018.1516861>
- Schwab, S., Kulmhofer-Bommer, A., Goldan, J., & Hoffmann, L. (2021). Math, German and English Teachers' Student Specific Self-Efficacy – Is it a matter of students' characteristics? *Educational Psychology*, 41(10), 1224–1240.
- Siwatu, K. O. (2011). Preservice teachers' sense of preparedness and self-efficacy to teach in America's urban and suburban schools: Does context matter? *Teaching and Teacher Education*, 27(2), 357–365. <https://doi.org/10.1016/j.tate.2010.09.004>
- Skaalvik, E. M., & Skaalvik, S. (2017). Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in senior high school. *Social Psychology of Education*, 20(1), 15–37. <https://doi.org/10.1007/s11218-016-9363-9>
- Stuhlman, M. W., & Pianta, R. C. (2002). Teachers' narratives about their relationships with children: Associations with behavior in classrooms. *School Psychology Review*, 31(2), 148–163. <https://doi.org/10.1080/02796015.2002.12086148>
- Sun, P., Qu, Y., Wu, J., Yu, J., Liu, W., & Zhao, H. (2018). Improving Chinese teachers' stress coping ability through group sandplay. *The Spanish Journal of Psychology*, 21, 65. <https://doi.org/10.1017/sjp.2018.69>
- Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17(7), 783–805. [https://doi.org/10.1016/S0742-051X\(01\)00036-1](https://doi.org/10.1016/S0742-051X(01)00036-1)
- Urdu, T. (2004). Using multiple methods to assess student's perceptions of classroom goal structures. *European Psychologist*, 9(4), 222–231. <https://doi.org/10.1027/1016-9040.9.4.222>
- van Uden, J. M., Ritzen, H., & Pieters, J. M. (2013). I think I can engage my students. Teachers' perceptions of student engagement and their beliefs about being a teacher. *Teaching and Teacher Education. An International Journal of Research and Studies*, 32(1), 43–54.

- Venetz, M., Zurbriggen, C. L. A., & Schwab, S. (2019). What do teachers think about their students' inclusion? Consistency of students' self-reports and teacher ratings. *Frontiers in Psychology, 10*, 1637. Article 1637. <https://doi.org/10.3389/fpsyg.2019.01637>
- Venetz, M., Zurbriggen, C., Eckhart, M., Schwab, S., & Hessels, M. G. P. (2015). *The perceptions of inclusion questionnaire (PIQ). German version*. Perceptions of Inclusion Questionnaire (PIQ). Retrieved October 6, 2021, from <https://piqinfo.ch/wp-content/uploads/2019/08/piq-deutsch.pdf>
- Wagner, W., Göllner, R., Werth, S., Voss, T., Schmitz, B., & Trautwein, U. (2016). Student and teacher ratings of instructional quality: Consistency of ratings over time, agreement, and predictive power. *Journal of Educational Psychology, 108*(5), 705–721. <https://doi.org/10.1037/edu0000075>
- Zee, M., & Koomen, H. (2020). Engaging children in the upper elementary grades: Unique contributions of teacher self-efficacy, autonomy support, and student-teacher relationships. *Journal of Research in Childhood Education, 34*(4), 477–495. <https://doi.org/10.1080/02568543.2019.1701589>
- Zee, M., & Koomen, H. M. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research, 86*(4), 981–1015. <https://doi.org/10.3102/0034654315626801>
- Zee, M., Koomen, H. M., Jellesma, F. C., Geerlings, J., & de Jong, P. F. (2016). Inter-and intra-individual differences in teachers' self-efficacy: A multilevel factor exploration. *Journal of School Psychology, 55*, 39–56. <https://doi.org/10.1016/j.jsp.2015.12.003>

## Appendix

### Appendix A

English Version				
Domain	Item (Zee et al., 2016)	Item	Teachers' student-specific version	Student version
ES	21	1	I can provide a safe and secure environment for this student in the classroom.	My teacher can provide a safe and secure environment for me.
SE	12	2	I can get this student to believe she/he can do well in schoolwork.	My teacher can get me to believe I can do well in schoolwork.
BM	8	3	I can get this student to follow classroom rules.	My teacher can get me to follow classroom rules.
IS	2	4	I can craft stimulating questions for this student.	My teacher can craft stimulating questions for me.
ES	22	5	I can recognise in time that this student does not feel well.	My teacher can recognise in time that I do not feel well.
SE	13	6	I can help this student to value learning.	My teacher can help me to value learning.
IS	4	7	I can adjust the lessons to the proper level for this student.	My teacher can adjust the lessons to the proper level for me.
BM	10	8	I can prevent this student from negatively affecting the classroom atmosphere.	My teacher can prevent me from negatively affecting the classroom atmosphere.
ES	23	9	I can provide timely support for this student.	My teacher can provide timely support for me.
SE	15	10	I can help this student to understand the learning content.	My teacher can help me to understand the learning content.
BM	11	11	I can make behavioural expectations clear to this student.	My teacher can make behavioural expectations clear to me.
IS	5	12	I can gauge this student's comprehension of what I have taught.	My teacher can gauge my comprehension of what she/he has taught.
IS	6	13	I can provide appropriate challenges for this student.	My teacher can provide appropriate challenges for me.
BM	7	14	I can control the disruptive behaviour of this student.	My teacher can control my disruptive behaviour.
SE	14	15	I can motivate this student to do his/her schoolwork.	My teacher can motivate me to do my schoolwork.
ES	25	16	I can adjust learning tasks to this student's needs and interests.	My teacher can adjust learning tasks to my needs and interests.

Answer format: "not at all"—"rather not"—"neither"—"rather yes"—"certainly."

The original scale comprises 25 items; see Zee et al. (2016).

## Appendix B

## German Version

German Version		Student version	
Domain	Item (Zee et al., 2016)	Item	Teachers' student-specific version Mein Lehrer ...
ES	21	1	Ich kann diesem Kind ein sicheres und geschütztes Umfeld bieten.
SE	12	2	Ich kann diesem Kind den Glauben vermitteln, dass es gute Schulleistungen erbringen kann.
BM	8	3	Ich kann dieses Kind dazu bringen, die Klassenregeln zu befolgen.
IS	2	4	Ich kann stimulierende Fragen für dieses Kind gestalten.
ES	22	5	Ich merke es rechtzeitig, dass dieses Kind sich nicht wohlfühlt.
SE	13	6	Ich kann diesem Kind dabei helfen, den Wert des Lernens zu begreifen.
IS	4	7	Ich kann meine Stunden an das passende Niveau/Level für dieses Kind anpassen.
BM	10	8	Ich kann verhindern, dass dieses Kind das Klassenklima negativ beeinflusst.
ES	23	9	Ich kann diesem Kind rechtzeitig Unterstützung anbieten.
SE	15	10	Ich kann diesem Kind dabei helfen, den Lernstoff zu verstehen.
BM	11	11	Ich kann diesem Kind meine Verhaltenserwartungen klar vermitteln.
IS	5	12	Ich kann das Verständnis dieses Kindes für das Gelehrte einschätzen.
IS	6	13	Ich kann diesem Kind passende Herausforderungen bieten.
BM	7	14	Ich kann störendes Verhalten dieses Kindes regulieren.
SE	14	15	Ich kann dieses Kind für Schulaufgaben motivieren.
ES	25	16	Ich kann Lernaufgaben an die Bedürfnisse und Interessen dieses Kindes anpassen.

Answer format: "trifft überhaupt nicht zu"—"trifft eher nicht zu"—"weder noch"—"trifft eher zu"—"trifft völlig zu"  
The original scale comprises 25 items; see Zee et al. (2016).